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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
SCOTT WOODWARD BENNETT, et al.)	Group Art Unit
)	
Serial No.)	
)	Examiner
Filed: Herewith)	
)	
For: HYDRAULIC PISTON MADE FROM)	Attorney Docket 1-25009
ROLLED SHEET METAL, METHOD)	
FOR ITS MANUFACTURE AND)	
INTERMEDIATE PRODUCT OF)	
THE METHOD)	

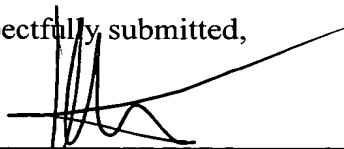
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

TRANSMITTAL OF VERIFIED ENGLISH TRANSLATION OF
PRIORITY APPLICATION NEW CLAIMS

Honorable Sir:

Attached please find a verified English translation of priority application new claims for Application No. PCT/EP02/08887.

Respectfully submitted,



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V E R I F I C A T I O N

I, Madgie Vintin, BA., MITI., translator to Taylor & Meyer of 20 Kingsmead Road, London, SW2 3JD, hereby declare that I am the translator of the documents attached, and certify that the following is a true translation, to the best of my knowledge and belief.

Madgie Vintin

(translator)

(date)

Claims

1. Cup-shaped hydraulic piston (10) made from rolled sheet metal, comprising
 - 5 - an open end (12),
 - a side wall (16) with a cylindrical outer surface (18) and an inner surface (22), wherein the side wall (16) at its outer surface (18) is provided with an annular groove (20) in a portion adjoining the open
 - 10 end (12), and
 - a piston head (14),wherein a portion (24) of the inner surface (22) of the side wall (16) adjoining the open end (12) and extending in axial direction over the annular groove
 - 15 (20) has a cylindrical shape, and wherein the thickness of the side wall (16) decreases monotonically from the portion (24) of the inner surface (22) up to the piston head (14).
- 20 2. Hydraulic piston according to claim 1, characterized in that the piston head (14) is curved inwards.
3. Hydraulic piston according to claim 2,
 - 25 characterized in that the piston head (14) is curved in a concave manner.
4. Hydraulic piston according to claim 2,
 - 30 characterized in that the radially outer part of the piston head (14) has the shape of a truncated cone and the central part of the piston head (14) has the shape of a spherical cap.

5. Hydraulic piston according to claim 4,
characterized in that the extension of the truncated-
cone-shaped part of the piston head (14) along its
profile is not greater than three times the wall
5 thickness of the side wall (16) in its portion
adjoining the piston head (14).
6. Method of manufacturing a hydraulic piston according
to one of the preceding claims, comprising the steps:
10 - punching a disk-shaped round blank out of a piece of
rolled sheet metal,
- deep-drawing the disk-shaped round blank into a cup
shape by means of a bottom die and a punch,
- stamping the cup-shaped blank to form the piston
15 head and the cylindrical outer surface of the
hydraulic piston, and
- incorporating an annular groove into the outer
surface of the hydraulic piston.
- 20 7. Method according to claim 6,
characterized in that the disk-shaped round blank
during deep-drawing into a cup shape is pressed
firstly by means of a first punch through a first
circular die opening and then by means of a second
25 punch through a second circular die opening, the
diameter of which is smaller than the diameter of the
first die opening.
8. Method according to claim 7,
30 characterized in that the first punch and the second
punch are cylindrical.

9. Method according to claim 7 or 8,
characterized in that the cup-shaped blank is pressed
by means of a third punch through a third circular die
opening, the diameter of which is smaller than the
5 diameter of the second die opening, wherein the third
punch has a first cylindrical portion emanating from
its free end and adjoined by a second cylindrical
portion, the diameter of which is greater than the
diameter of the first cylindrical portion and smaller
10 than the diameter of the third die opening, in order
to form a step in the side wall at the open end of the
blank.
10. Method according to claim 9,
15 characterized in that subsequent to deep-drawing into
a cup shape a first stamping operation is effected to
form an inwardly curved piston head in that a step-
shaped punch comes into engagement with the step in
the side wall of the blank and presses the blank into
20 a bottom forming die.
11. Method according to claim 10,
characterized in that subsequent to the first stamping
operation the cup-shaped blank is pressed by means of
25 a step-shaped punch, which comes into engagement with
the step in the side wall of the blank, through a
fourth circular die opening, the diameter of which is
smaller than the diameter of the third die opening, in
order to form the cylindrical outer surface of the
30 side wall.

12. Method according to claim 11,
characterized in that subsequent to forming of the
cylindrical outer surface of the side wall a second
stamping operation is effected by means of a bottom
forming die and a step-shaped punch, which comes into
engagement with the step in the side wall of the
blank, in order to form a transition region between
the piston head and the side wall.
13. Method according to claim 12,
characterized in that the region of the bottom die
touching the piston head is cap-shaped in the centre
and truncated-cone-shaped at the edge.
14. Method according to claim 12 or 13,
characterized in that subsequent to forming of the
transition region between the piston head and the side
wall a third stamping operation is effected by means
of a bottom forming die and a step-shaped punch, which
comes into engagement with the step in the side wall
of the blank, in order to form the final configuration
of the piston head.
15. Method according to one of claims 6 to 14,
characterized in that subsequent to forming of the
annular groove at least the outer surface is
subsequently machined, wherein the subsequent
machining comprises at least one of the following
steps:
- grinding;
 - coating, and
 - polishing.